



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/678,434	10/03/2003	Zhaozhong Jiang	JJK-0335 (P2002J084)	1597
27810	7590	08/24/2006	EXAMINER	
EXXONMOBIL RESEARCH AND ENGINEERING COMPANY P.O. BOX 900 1545 ROUTE 22 EAST ANNANDALE, NJ 08801-0900			SINGH, PREM C	
		ART UNIT	PAPER NUMBER	
		1764		

DATE MAILED: 08/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/678,434	JIANG ET AL.	
	Examiner	Art Unit	
	Prem C. Singh	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 04 August 2006.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-7, 12 and 13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-7, 12 and 13 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 03 October 2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date 06/08/2006.
 - 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
 - 5) Notice of Informal Patent Application (PTO-152)
 - 6) Other: _____.

DETAILED ACTION

Response to Amendment

Cancellation of claims 8-11 is noted.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

Art Unit: 1764

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-7, 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yen (US Patent 4,767,522) in view of Apelian et al (US Patent 5,976,351).

Yen invention discloses that the feedstock for the present process will normally be a C₁₀+ feedstock containing paraffins, olefins, naphthenes, aromatics and heterocyclic compounds (Column 3, lines 5-8). The general hydrodewaxing conditions include a temperature between 450°F (232°C) and about 850°F (454°C), a pressure between 0 and about 3000 psig, preferably between about 100 and about 1000 psig. The LHSV, i.e., the volume of feedstock per volume of catalyst per hour, is generally between about 0.1 and about 10 and preferably between 0.2 and about 4; and the hydrogen to feedstock ratio is generally about 500 and about 8000 and preferably between about 800 and 5000 standard cubic feet (scf) of hydrogen per barrel of feed (Column 3, lines 24-34).

Yen invention further discloses that the catalyst used in this process comprises a medium pore crystalline silicate zeolite and a large pore crystalline silicate zeolite having a constraint index less than 2 and having hydroisomerization activity, e.g.,

zeolite beta, preferably in combination, with a hydrogenation component Column 3, lines 40-45). A portion of the novel class of zeolites useful herein are termed medium or intermediate pore zeolites and have an effective pore size of generally less than about 7 angstroms, such as freely sorb normal hexane. By "effective pore size" it is meant that the pores of the medium pore zeolite behave in the same fashion as perfectly cylindrical pores, generally less than 7 angstroms in size (Column 3, lines 51-58). Constraint index (CI) values for typical medium pore zeolites, including those useful herein are: ZSM-5, ZSM-11, ZSM-12, ZSM-23, ZSM-38, ZSM-35, ZSM-48, TMA Offretite (Column 4, lines 34-44). Suitable large pore zeolites include zeolite beta, ZSM-4, ZSM-20, Modernite, TEA modernite, dealuminized Y, and rare earth Y (REY) (Column 4, lines 47-49). The preferred hydrogenation components are the noble metals of Group VIII A, especially platinum, but other noble metals, such as palladium, gold, silver, rhenium or rhodium may also be used (Column 5, lines 65-68). The crystalline silicate zeolite utilized in the process of this invention is desirably employed in intimate combination with one or more hydrogenation components, such as tungsten, vanadium, zinc, molybdenum, rhenium, nickel, cobalt, chromium, manganese, or a noble metal such as platinum or palladium in an amount between about 0.1 and about 25% by weight, normally 0.1 to 5% by weight especially for noble metals, and preferably 0.3 to 1% by weight (Column 7, lines 13-22). The catalysts of this invention are typically prepared by mulling together from about 5 to 60% by weight, preferably 20 to 40% by weight medium pore zeolite ($\text{SiO}_2/\text{Al}_2\text{O}_3$ mole ratio of 70), from about 5 to 60% by weight, preferably 20 to 40% by weight large pore zeolite e.g., NH_4 -zeolite beta ($\text{SiO}_2/\text{Al}_2\text{O}_3$ mole ratio of 30), and from 0 to about 50% by

Art Unit: 1764

weight, preferably 0 to 40% by weight, binder, e.g., alpha-alumina-monohydrate (Column 8, lines 1-9). The catalyst thus prepared contains from about 0.1 to 2% by weight, preferably 0.3 to 1% by weight of finally dispersed platinum (Column 8, lines 17-19).

Yen invention also discloses in Example 3 the effect of 0.45% Pt-ZSM-5/Zeolite beta on the charge stock (Column 9, lines 50-60). The pour point of the final product is shown in Table 3 as 20°F (-6°C) (Column 10, line 4).

Although Yen invention does not specifically mention about unidimensional intermediate pore and the difference between a maximum and minimum diameter, but since Yen is using an intermediate pore zeolite (ZSM-48) with cylindrical pores similar to the zeolite claimed by the applicant, the pores of zeolite disclosed in Yen invention must inherently be unidimensional and the difference between the maximum and the minimum diameter must be less than 0.05 nm.

Yen invention discloses the use of catalyst prepared by mulling together medium pore zeolite (ZSM-5) and large pore zeolite (zeolite Beta). It does not disclose a cascaded two-bed catalyst system.

Yen invention does not specifically mention the alpha value of ZSM-48.

Yen invention does not disclose the viscosity index of the finished lubricant.

Apelian invention discloses the production of high viscosity index lubricants by isomerizing petroleum waxes using boron-free zeolites with high SiO₂/Al₂O₃ ratios. The

waxes may be hydrocracked prior to isomerization. The isomerization product may be further dewaxed by either solvent or catalytic means in order to achieve a target pour point (Column 1, lines 31-36). The concept of the instant invention involves a process for dewaxing waxy feedstocks using as catalysts large pore zeolites having low acidity and possessing at least one Group VIII metal without the use of boron. The Group VIII metal is preferably a noble metal such as Pt or Pd (Column 3, lines 65-67; column 4, lines 1-2). Large pore zeolites applicable to this invention are defined as having a constraint index less than 1 and include zeolite beta (Column 4, lines 7-9). The feedstocks to the isomerization step used in this invention preferably contain more than 40% wax (Column 4, lines 22-23). A typical initial boiling point of the feed exceeds 650°F (343°C) (Column 5, lines 1-2). In general terms, the catalyst should have an alpha value below 30 prior to metals addition, with preferred values below 20 (Column 9, lines 58-60).

Apelian invention also discloses that the preferred catalysts for use as the dewaxing catalysts are the relatively constrained intermediate pore size zeolites. Such preferred zeolites have a constrained index in the range of 1 to 12 (Column 13, lines 17-20). Zeolites conforming to these sorption requirements include the naturally occurring zeolite ferrierite as well as the synthetic zeolites ZSM-22, ZSM-23, and ZSM-35 (Column 13, lines 54-56). The dewaxing catalysts used in the shape-selective catalytic dewaxing include a metal hydrogenation-dehydrogenation component (Column 14, lines 11-13). The metal will be preferably platinum or palladium. The amount of the metal component will typically be 0.1 to 10 % by weight (Column 14, lines 22-24). Example 6

and Figure 4, infra illustrate the effectiveness of employing ZSM-23 in combination with zeolite beta in an integrated catalyst system (Column 14, lines 44-46). Thus, by applying these properties of the intermediate pore size molecular sieves in combination with the properties of a large pore zeolites as described above, it has become possible to evolve a synergistic catalytic dewaxing process which makes the most effective use of the two types of zeolites. A large pore zeolite is used in an initial stage to convert waxy paraffins to less waxy iso-paraffins by isomerization, acting preferentially on the waxy components in the back end of the feed. The partly dewaxed feed is then processed over an intermediate pore size zeolite to convert the residual waxy components so that the final product has a low pour point and low cloud point (Column 15, lines 35-46). The products from the process are high VI (viscosity index), low pour point materials which are obtained in excellent yield (Column 15, lines 48-49). VI values in the range of 130 to 150 are typically obtained (Column 15, lines 53-54).

It would have been obvious to one skilled in the art at the time the invention was made to combine the teachings of Yen and Apelian inventions and change the sequence of catalyst beds in Apelian invention, i.e., intermediate pore zeolite (ZSM-23) followed by large pore zeolite (zeolite beta) to conduct dewaxing first and then isomerization. Since ZSM-23 is functionally similar to ZSM-48 (Yen: column 4, lines 39-44), one skilled in the art can use ZSM-48 followed by zeolite beta in a cascade of two beds for a compact and economical setup and easier operation.

It would have been obvious to one skilled in the art at the time the invention was made to use alpha value as claimed for an enhanced cracking activity.

By combining the teachings of Yen and Apelian, a finished lubricant having a viscosity index as claimed would be produced.

Response to Arguments

The Applicant argues that teaching the use of a composite catalyst in no way constitutes a teaching or a suggestion that the two catalysts be used independently and in a sequence nor what sequence to use.

The Applicant's argument is not persuasive because Yen discloses the results of dewaxing on a medium pore and also on a large pore catalyst. Yen discloses, "It is apparent from the Examples that the catalyst of the present invention is intermediate in distillate selectivity and activity between a distillate dewaxing catalyst, Ni-ZSM-5, and the catalyst Zeolite Beta. The Pt-ZSM-5/Zeolite Beta catalyst produced a 330°F+ yield of 73.7 wt % at a 20°F pour point, compared to a 65.1 wt % yield with Ni-ZSM-5 catalyst and a 90.3 wt % yield with the Zeolite Beta catalyst. The activity of the Pt-ZSM-5/Zeolite Beta catalyst was only 20° F less than for the Ni-ZSM-5 catalyst, but 55° F more than for the Zeolite Beta catalyst." (Column 10, lines 11-21).

Yen further adds, "It can be seen from the examples that a feedstock reacted over a medium pore zeolite produces a greater yield of gasoline (C₅-330°F) than the feedstock reacted over a larger pore zeolite (24.9 wt % vs. 8.0 wt %). However, the

Art Unit: 1764

reverse is true with respect to distillate yield (65.1 wt % vs. 90.3 wt %). Thus, it is an additional feature of the present invention that the ratio of gasoline product to distillate product yield is controlled by controlling the composition of the catalyst. If a greater gasoline-to-distillate yield ratio is desired, then the ratio of medium pore zeolite to large pore zeolite should be increased. Alternatively, a larger distillate-to-gasoline yield ratio requires an increased ratio of large pore zeolite to medium pore zeolite in the catalyst." (Column 10, lines 33-47).

The Applicant argues that Apelian does not teach, suggest or imply that the order of the use of the different catalysts can or should be reversed nor that if the order is reversed, a viable product would still be secure.

The Applicant's argument is not persuasive because Apelian discloses, "Example 6 and Figure 4, infra illustrate the effectiveness of employing ZSM-23 in combination with zeolite beta in an integrated catalyst system." (Column 14, lines 44-46).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

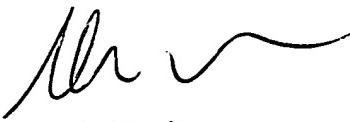
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prem C. Singh whose telephone number is 571-272-6381. The examiner can normally be reached on MF 6:30 AM-3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ps/081006



Giann Caidarola
Supervisory Patent Examiner
Technology Center 1700